CLAIMS:

1. A method of inducing differentiation of a stem cell, the method including:

culturing a stem cell in the presence of an embryonic cell and/or extracellular medium of an embryonic cell, under conditions that induce differentiation of the stem cell.

2. A method according to claim 1 wherein the stem cell is selected from the group including embryonic stem cells, pluripotent stem cells, haematopoietic stem cells, totipotent stem cells, mesenchymal stem cells, neural stem cells, or adult stem cells.

3. A method according to claim 1 wherein the stem cell is human.

4. A method according to wherein the embryonic cell is derived from embryonic, extraembryonic, endoderm or ectoderm tissue.

5. A method according to claim 4, wherein the embryonic cell is derived from visceral endoderm tissue, or visceral endoderm-like tissue.

6. A method according to claim 5 wherein the visceral endoderm or visceral endoderm-like tissue is derived from an early postgastrulation embryo.

7. A method according to claim 5 ~~or 6~~ wherein the visceral endoderm-like tissue is an embryonic cell line.

8. A method according to claim 7 wherein the embryonic cell line is an END-2 cell line.

9. A method according to claim 1 wherein the embryonic cell is derived from mouse embryo E7.5.

10. A method according to claim 1 comprising:

preculturing the embryonic cell to a substantially confluent monolayer; and

co-culturing the stem cell in the presence of the embryonic cell monolayer and/or extracellular media of the embryonic cell monolayer.

11. A method according to claim 10 wherein the stem cell and embryonic cell monolayer are separated by a filter or a cellular matrix.

12. A method according to claim 1 wherein the stem cell is induced to differentiate into a cell selcted from the group including muscle cells, endothelial cells, epithelial cells, haematopoietic cells or neural cells.

13. A method according to claim 12 wherein the stem cell is induced to differentiate to a muscle cell or a vascular endothelial cell.

14. A method according to claim 13 wherein the muscle cell is a cardiomyocyte or a skeletal muscle cell.

15. A method according to claim 14 wherein the stem cell is induced to differentiate to a cardiomyocyte said method comprising:

culturing a stem cell in the presence of an embryonic visceral endoderm cell and/or extracellular medium of an embryonic visceral endoderm cell under conditions that induce differentiation of the stem cell into a cardiomyocyte.

16. A method according to claim 14 wherein the stem cell is induced to differentiate to skeletal muscle cell said method comprising:

culturing a stem cell in the presence of an embryonic ectoderm cell and/or extracellular medium of an embryonic ectoderm cell, under conditions that induce differentiation of the stem cell into a skeletal muscle cell.

17. A method according to claim 13 wherein the stem cell is induced to differentiate to a vascular endothelial cell, said method comprising:

culturing a stem cell in the presence of an embryonic ectoderm and/or endoderm cell, and/or extracellular medium of an embryonic, ectoderm and/or

endoderm cell under conditions that induce differentiation of the stem cell into a vascular endothelial cell.

18. A method according to claim 17 wherein the ectoderm and/or endoderm tissue is extraembryonic.

19. A method according to claim 18 further including culturing the stem cells in the presence of VEGF.

20. A method according to claim 1 wherein the stem cell is genetically modified.

21. A differentiated cell prepared by a method according to claim 1.

22. A cardiomyocyte prepared by the method according to claim 15.

23. A skeletal muscle cell prepared by the method according to claim 16.

24. A vascular endothelial cell prepared by the method according to claim 17.

25. An isolated factor that induces differentiation of a stem cell said factor derived from an embryonic cell or extracellular medium of a cultured embryonic cell.

26. A factor according to claim 25 wherein the embryonic cell is selected from the group including embryonic, extraembryonic, endoderm or ectoderm tissue.

27. A factor according to claim 25 wherein the embryonic cell is derived from visceral endoderm tissue, or visceral endoderm-like tissue.

28. A factor according to claim 27 wherein the visceral endoderm or visceral endoderm-like tissue is derived from an early postgastrulation embryo.

29. A factor according to claim 27 wherein the visceral endoderm-like tissue is an embryonic cell line.

30. A method of inducing differentiation of a stem cell, said method including culturing the stem cell in the presence of the factor according to claim 25.

31. A differentiated cell prepared by the method according to claim 30.

32. A method of treating or preventing a cardiac disease or condition in a patient, said method comprising:

introducing to the patient a cardiomyocyte according to claim 22 and/or a cardiomyocyte progenitor that has been co-cultured in the presence of embryonic visceral endoderm cells and/or extracellular medium of embryonic visceral endoderm cells.

33. A method according to claim 32 wherein the cardiac disease or condition is selected from the group including myocardial infarction, or cardiac hypertrophy.

34. A method of repairing damaged cardiac tissue, said method comprising:

introducing to the damaged cardiac tissue, a cardiomyocyte according to claim 22 and/or a cardiomyocyte progenitor that has been co-cultured in the presence of embryonic visceral endoderm cells or extracellular medium of embryonic of embryonic visceral endoderm cells.

35. A method according to claim 33 wherein the damaged cardiac tissue results from cardiac ischaemia.

36. A method of treating or preventing muscle disease in a patient, said method comprising:

introducing the muscle of the patient, a skeletal muscle cell according to claim 23 and/or a skeletal muscle cell progenitor that has been co-cultured in the presence of embryonic ectoderm cells and/or extracellular medium of embryonic ectoderm cells.

37. A method according to claim 35 wherein the muscle disease is from the group including muscular dystrophy.

38. A method of treating or preventing vascular disease in vascular tissue, said method comprising:

introducing to the vascular tissue, a vascular endothelial cell according to claim 24 and/or a vascular endothelial progenitor cell that has been co-cultured in the presence of an embryonic ectoderm and/or endoderm cell and/or extracellular medium of an embryonic ectoderm and/or endoderm cell.

39. A method according to claim 38 wherein the vascular disease is selected for the group including hereditary hemorrhagic telangiectasia, vascular deterioration as a result of diabetes or smoking.

40. (Original) A model for testing suitability of a cardiomyocyte cell for cardiac transplantation, said model comprising:

an immunodeficient animal having a measurable parameter of cardiac function wherein said animal is capable of receiving by a cardiomyocyte or cardiomyocyte progenitor by transplantation; and

a means to determine cardiac function of the animal before and after transplantation of the cardiomyocyte.

41. A model according to claim 40 wherein the immunodeficient animal is created as a model of cardiac muscle degeneration following infarct.

42. A model according to claim 40 wherein the parameter of cardiac function is contractile function.

43. A model for testing suitability of a cardiomyocyte cell for cardiac transplantation, said model comprising:

an immunodeficient animal having a measurable parameter of cardiac function wherein said animal is capable of receiving by a cardiomyocyte or cardiomyocyte progenitor by transplantation; and

a means to determine cardiac function of the animal before and after transplantation of the cardiomyocyte, wherein the cardio myocyte is a cell according to claim 22.

44. A cardiomyocyte selected for cardiac repair as determined by the model according to claim 40.